

Ripped from the ROUNDUP

Ripped straight from the pages of old Space News Roundups, here's what happened at JSC on this date:

1966

The elation of Gemini IX's perfect reentry and landing closest to the prime recovery vessel of any manned mission to date was tempered somewhat by the disappointment of not having done all the things that were set out as mission objectives.

Gemini IX's successes included pilot Gene Cernan's two hours and ten minutes of extravehicular activity, rendezvous with the Augmented Target Docking Adapter (ATDA) by three different rendezvous techniques, the gaining of knowledge of man's capabilities and limitations to do useful work in space and of the value of close-up manned observation of another satellite on orbit and the most accurately controlled reentry of any US manned space flight.

1976

The first of two Shuttle Training Aircraft (STA) arrived at Ellington Air Force Base on Tuesday, June 8.

The STA is a modified Grumman Gulfstream II twin engine jet aircraft that will be used in crew training to simulate the flight characteristics of the Shuttle Orbiter.

Johnson Space Center personnel will perform a receiving inspection on the aircraft after its arrival. The STA will then be returned late this month to Grumman, Bethpage, N.Y., for installation of an electric aileron trim system. This minor modification to the STA control system will take approximately one week.

The second STA is scheduled for delivery to JSC late in July.

1986

Although a minor storm by the standards of Carla or Camille, Hurricane Bonnie's approach toward the Texas Gulf Coast last week underscored JSC's continued efforts to be ready in the event of severe weather.

The Center declared a Level II state of preparedness at 11:15 a.m. June 25 when Bonnie, then headed directly toward Galveston, was upgraded from a tropical storm to a hurricane.

At level II, teams fan out across the Center and begin the several-hour-job of safeing computer systems, strapping down trash can lids, sandbagging manhole covers and pulling the park benches in. During Level II, a Hurricane Command Post is activated in Bldg. 30 Action Center and a hurricane rideout team is assembled.



# 2001 Savings Bond Campaign

## Two changes to program will make it easier to buy bonds

By Candace Hunt

JSC's U.S. Savings Bond campaign begins June 4 and continues through June 15, 2001. This year we have two changes to the Savings Bond program that make it easier to buy bonds through Employee Express and adds the option of a new type of bond, which gives our employees even more ways to save.

Employee Express enables employees to buy bonds through payroll savings, status their account and change their bond allotments, all with the click of a mouse. It's easy, fast and secure.

Additionally, we're now able to offer the inflation-indexed I Bond along with the Series EE Savings Bond through payroll savings. The new I Bond earns an adjustable interest rate that keeps savings growing over and

above inflation for up to 30 years. Their earning rate is based on the Treasury's fixed rate of return combined with a semi-annual inflation rate based on changes in the Consumer Price Index for all urban consumers (CPI-U). The current rate for I Bonds as of May 1 is 5.92 percent.

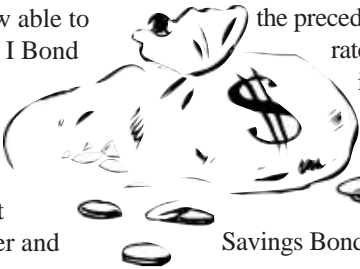
Interest rates for Series EE savings bonds are based on market yields of actively traded Treasury notes and bills, and are adjusted every six months, climbing as market rates increase. Each May 1 and November 1, the Treasury announces the rate, which is 90 percent of the average yield on five-year Treasury securities for the preceding six months. The current rate for EE Bonds as of May 1 is 4.50 percent.

Whether you choose I Bonds or Series EE Bonds, they provide many advantages. Savings Bonds are backed by the full faith

and credit of the United States. Your Savings Bonds are registered, so the Treasury can replace them if they're lost, mutilated or stolen. Interest earned is not subject to state or local taxes, and federal tax liability can be deferred until the bonds reach final maturity or are cashed, whichever is first.

In addition, when bonds are redeemed for the purpose of financing higher education—yours or your children's—interest earned under some circumstances is completely tax free. Bonds can be cashed any time after six months, but bonds cashed before five years are subject to a three-month interest penalty.

More information about savings bonds can be found on the JSC homepage at <http://www4.jsc.nasa.gov/> or on the Human Resources Office homepage at <http://hro.jsc.nasa.gov/>. If you have additional questions, contact your directorate campaign coordinator or Candy Hunt at 31836. ■



Safety experts agree the single most important factor in surviving a criminal attack is to have a personal safety strategy in place before it is needed.

Three out of four women fall victim—so even your odds. JSC Occupational Safety and Occupational Health offices will offer the Refuse to be a Victim seminar on Wednesday, June 6 in the Building 30 auditorium. The event runs from 11 a.m. to noon. The seminar will

offer tips and safety strategies from which you can develop your own plan.

Seating is limited, so arrive early. For more information, call (713) 682-8060 or e-mail [tomneal@flash.net](mailto:tomneal@flash.net)

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## STS-100 overcomes computer problems

From Kennedy Space Center, NASA and Boeing personnel—who ran prelaunch Multi-Element Integrated Testing with the hardware—flew to Houston to help out. The International Software Integration Lab, located at the Sonny Carter Training Facility, also supported the troubleshooting.

Lead ODIN flight controller Jim Dewberry worked with his staff to check software loaded to the computers for any anomalies.

When station Flight Director Mark Ferring's team relieved Curry's team in the station Flight Control Room, the shuttle's communication system provided the only communications that ground controllers had with the station.

Mission Control then spent the next several hours attempting to get the computers to respond. "We had a lot of people working some really long hours trying to solve this problem," said Gahring.

### Light...camera...

"Finally, we decided to try a command where the result would be obvious to the crew. We attempted to turn off a light in the Destiny lab, which actually worked," Ferring said. "So we knew that somehow the third computer was processing commands but was not shipping data and command responses to the ground."

As the time approached for the tired crew to go to sleep, they routed a video signal via the shuttle using a special "extension cord." They also positioned a television camera to view the light in the Destiny lab. When Mission Control sent commands, the light would turn on or off to confirm the computer was paying attention. Mission Control used this extensively through the night as a way to monitor progress as they attempted to restore ground command of the station.

The docked shuttle proved an invaluable resource during this trying time. "We were able to continue communicating with the station crew via voice and video while we attempted to figure out what could possibly be causing the loss of all

three primary computers," said Ferring.

"Without the coordinated efforts of both crews, the shuttle and station flight control teams and the sharing of shuttle and station onboard technical resources, I believe the troubleshooting and eventual recovery of the system would have been even more difficult and time consuming than what we experienced," Ferring said.

Mission Control executed a plan to recover telemetry. It worked. The second computer was operating again. An alarm woke the crew and they connected a laptop to get the status of the station. They also arranged the computer to send data via the docked shuttle.

Now that the computer system had a lifeline, regaining use of the S-band antenna—offline because of the failures—proved the next challenge. When the crew attempted to connect with the antenna, the computer failed. For the first time, the station lost the use of all command and control computers.

"These computers are used for command and control of the station. This is why we built the redundancy. It is incredible for three to fail in a 24-hour period," Curry said.

Logically, a plan existed in the event that all three shut off. The two Unity module computers have a software design called Mighty Mouse for its "Here I come to save the day" effort. When this executed and the computers "power cycled," the second computer recovered. It has been up and running ever since. The command and control system finally regained stability.

Shortly after the recovery of the second computer, in the early hours of the morning on April 26, the Unity computers failed. The ODIN team resolved the problem and the Unity computers recovered full data capacity.

### Not out of the woods yet...

The crew borrowed a payload computer to replace the first command and control computer. The ODIN team and the Mission Evaluation Room's avionics team worked to load software

into the "new" computer over the weekend of April 28, the first ever in flight attempt. The computer is fully functional on backup mode, but more activity is required to get it ready for assembly mission 7A. The failed hard drive returned aboard *Endeavour* May 1.

A spare, built out of existing computer components on board, replaced the third computer. Three teams working round-the-clock shifts over the weekend of May 5 loaded the spare with software.

"I am so proud of the ODIN team because they responded to these failures with tough and competent spirit," Curry said. "No mistakes were made in the commands or the loading of the software. This is why today we have three fully functioning command and control computers. It is a tribute to the work of the ODIN team and the Mission Evaluation Room team."

Flight controllers disabled the second computer's safing response so if the hard drive failed, the whole computer would not shut down. The station used the computer until the International Software Integration Lab certified a new hard drive, which arrived on the Russian Progress flight May 22.

The faulty mass storage devices are still under review at Raymond, the hard drive manufacturer.

"In my 20 years in operations at JSC, I witnessed the most Herculean effort of my career during this mission," Ferring said. "The selfless dedication to understanding and resolving this problem by the engineering and operations communities was a sight to behold."

"Program management bent over backwards to ensure that all available resources from around the country were made available to the execution teams to attack this situation. The eventual success at regaining reasonable computer functionality and completing all the major objectives of this mission under severely degraded conditions is a fitting tribute to the teams' success." ■